Sustainability and low-carbon challenges of highspeed rail systems

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Abstract.

Integration of transportation and transit systems into real-world urban infrastructure systems requires extensive and genuine collaboration between scientists, engineers, policy makers, politicians and society. The goal of this symposium is to provide an interface among the engineering, scientific and general communities to foster applied research contributions from the critical steps of highspeed railway sciences to the first steps of engineering and the adoption of engineered systems to meet the needs of individuals, societies, regions, industries and countries. The topic of this symposium is very timely and original, especially when the U.K. currently and heavily invests in the highspeed rails (> £50 billions). The knowledge of life cycle and sustainability is extremely crucial for design, construction, maintenance and operations of the highspeed rails acting as the system of system.

The key objectives of this symposium are

- Provide formal and informal arenas to build long-lasting relationship between Japanese experts and the U.K. academic and industry.
- Enable knowledge transfer and share experience on highspeed rail systems, especially on the theme of life cycle management and sustainability.

- Highlight Birmingham as a world-class hub for high speed rails technology (Birmingham is home of National College for High Speed Rail, High Speed Two Ltd., British Alliance Rail Suppliers, and European-largest Birmingham Centre for Railway Research and Education).

The symposium addressed one of the most pressing issues in the U.K. High speed rail systems make significant difference to the public and provide positive contribution towards the environmental, social and economic sustainability of the communities they serve. They exist to provide social and economic connections, and people quickly take up the opportunities offered by increased mobility. Globally, high speed rails have proven to be the essential catalyst for regional growth and enhanced the quality of everyday life. This symposium had thus presented a great opportunity for the UK industry to access to extensive expertise from the pioneers in highspeed rails.

The presentation highlights collaborative research for improving sustainability and carbon footprint in transportation and transit systems in urban environments[1-12]. The collaborative researches are aligned with United Nation's Sustainable Development Goals. With proven research insights and open data sciences, the presentation reveals that 6D BIM can be used to enhance sustainability in railway industry.

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